

# Work Order ID 95142

\*95142\*

Page 1

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 \*1\*

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00 \*1\*

Customer:

Reference:

Approvals: Process Plan:      Date: 13-01-7 Tooling:      Date:     

Run Start \*NR1\*

QC:      Date:      SPC (Y/N):      Date:     

Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

|                  |   |      |  |  |  |  |  |  |  |
|------------------|---|------|--|--|--|--|--|--|--|
| Draw Nbr         | Revision Nbr  |      |  |  |  |  |  |  |  |
| D412-664-249     | Rev B/DEO   |      |  |  |  |  |  |  |  |
| 100              |   | 0.00 |  |  |  |  |  |  |  |
| *100*            | DOCUMENT CONTROL  |      |  |  |  |  |  |  |  |
| DC               | Memo  | 0.00 |  |  |  |  |  |  |  |
| Document Control | Photocopy bluefile and create labels as per PPP D412-664-209 CHG004 |      |  |  |  |  |  |  |  |

|           |           |      |  |  |  |  |  |  |  |
|-----------|-----------|------|--|--|--|--|--|--|--|
| 110       |           | 0.00 |  |  |  |  |  |  |  |
| *110*     | Packaging |      |  |  |  |  |  |  |  |
| Packaging | Memo      | 0.00 |  |  |  |  |  |  |  |
| Packaging |           |      |  |  |  |  |  |  |  |

|                      |   |      |  |  |  |  |  |  |  |
|----------------------|---|------|--|--|--|--|--|--|--|
| 120                  |   | 0.00 |  |  |  |  |  |  |  |
| *120*                | BENDING MACHINE - CROSSTUBES  |      |  |  |  |  |  |  |  |
| CNC Bend 2           | Memo  | 0.00 |  |  |  |  |  |  |  |
| CNC Alpha 160 Bender | Bend tube as per Dwg D412-664-249 using CNC bender program and Folio FT |      |  |  |  |  |  |  |  |

1 JG/MG 13-2-6

MO 13/01/23

MO/ru 13/01/23

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |             |             |            |   |                          |   |                        |                     |                     |  |  |
|--|-------------|-------------|------------|---|--------------------------|---|------------------------|---------------------|---------------------|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |             |             |            | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                          | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                        |                     |                     |  |  |
| <b>Root Cause</b>  | <b>Date</b> | <b>Step</b> | <b>Qty</b> | <b>Description of work order update or Non-conformance</b>  | <b>Initial Chief Eng</b> | <b>Action Description</b>   | <b>Sign &amp; Date</b> | <b>Verification</b> | <b>QC Inspector</b> |  |  |
| Doc/Data <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Equip/Tooling <input type="checkbox"/>                       |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Operator <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Material <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Setup <input type="checkbox"/>                               |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Other <input type="checkbox"/>                               |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Process <input type="checkbox"/>                             |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Supplier <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Training <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Unapproved <input type="checkbox"/>                          |             |             |            |   |                          |   |                        |                     |                     |  |  |

| FAULT CATEGORY  |  |  |   |  |  |   |  |  |  |  |   |  |
|---|--|--|---|--|--|---|--|--|--|--|---|--|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube |  |  | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio |  |  | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions |  |  | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge |  | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |  |

# Work Order ID 95142

**\*95142\***

Page 2

January-02-13 2:19:38 PM

Item ID: D412-664-209 Accept **\*N900040100\*** Setup Start **\*NS1\***  
 Revision ID: Stop **\*NS2\***  
 Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 **\*1\*** Cust Item ID:  
 Required Date: 1/25/13 Req'd Qty: 1.00 **\*1\*** Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start **\*NR1\***  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                  | Operation<br>Description  | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|---|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 130<br><b>*130*</b><br>QC<br>Quality Control    | QC Inspect dimensions to drawing<br><i>SOL 15</i><br>Memo   | 0.00<br>0.00         |         |        |              | (X)           |               |                  |                |
| 140<br><b>*140*</b><br>Crosstubes<br>Crosstubes | Crosstubes<br>Memo<br>***** ENSURE PROPER JIG POSITIONING *****<br>1-Drill Rivet holes as per Dwg D412-664-249<br>2-Drill pilot holes in tube as per Dwg D412-664-249<br>3-Ream hole to finish size in tube as per Dwg D412-664-249<br>4-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***<br>Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-249 | 0.00<br>0.00         |         |        |              |               |               |                  |                |

*JW*  
*JW*

13-01-24  
13-01-28

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |             |             |            |   |                          |   |                        |                     |                     |  |  |
|--|-------------|-------------|------------|---|--------------------------|---|------------------------|---------------------|---------------------|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |             |             |            | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                          | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                        |                     |                     |  |  |
| <b>Root Cause</b>  | <b>Date</b> | <b>Step</b> | <b>Qty</b> | <b>Description of work order update or Non-conformance</b>  | <b>Initial Chief Eng</b> | <b>Action Description</b>   | <b>Sign &amp; Date</b> | <b>Verification</b> | <b>QC Inspector</b> |  |  |
| Doc/Data <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Equip/Tooling <input type="checkbox"/>                       |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Operator <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Material <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Setup <input type="checkbox"/>                               |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Other <input type="checkbox"/>                               |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Process <input type="checkbox"/>                             |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Supplier <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Training <input type="checkbox"/>                            |             |             |            |   |                          |   |                        |                     |                     |  |  |
| Unapproved <input type="checkbox"/>                          |             |             |            |   |                          |   |                        |                     |                     |  |  |

| FAULT CATEGORY  |   |  |   |   |  |  |  |  |  |
|---|---|--|---|---|--|--|--|--|--|
| <b>Landing Gear</b>                                   |   |  | <b>General</b>                                |   |  |  |  |  |  |
| <input type="checkbox"/> Bending                      | <input type="checkbox"/> Bend           | <input type="checkbox"/> Grain                           | <input type="checkbox"/> Ovalized             | <input type="checkbox"/> Pressure/Forced    |  |  |  |  |  |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route      | <input type="checkbox"/> Hardware                        | <input type="checkbox"/> Over/Under tolerance | <input type="checkbox"/> Temperature/Cure   |  |  |  |  |  |
| <input type="checkbox"/> Cracks                       | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete           | <input type="checkbox"/> Part Incorrect       | <input type="checkbox"/> Weld               |  |  |  |  |  |
| <input type="checkbox"/> Crushed/Crimped              | <input type="checkbox"/> Burrs          | <input type="checkbox"/> Instructions Incomplete/Unclear | <input type="checkbox"/> Part Lost/Missing    | <input type="checkbox"/> Wrong Stock Pulled |  |  |  |  |  |
| <input type="checkbox"/> Cuffs                        | <input type="checkbox"/> Contamination  | <input type="checkbox"/> Maintenance                     | <input type="checkbox"/> Part Moved           |   |  |  |  |  |  |
| <input type="checkbox"/> Heat Treat                   | <input type="checkbox"/> Countersink    | <input type="checkbox"/> Misabeled                       | <input type="checkbox"/> Positioned Wrong     |   |  |  |  |  |  |
| <input type="checkbox"/> Inspection Strip in Tube     | <input type="checkbox"/> Cut Too Short  | <input type="checkbox"/> Misread                         | <input type="checkbox"/> Power Loss/Surge     | <input type="checkbox"/> Other              |  |  |  |  |  |
| <input type="checkbox"/> Ripples in Bend              | <input type="checkbox"/> Drill Holes    | <input type="checkbox"/> Offset                          |   |   |  |  |  |  |  |
| <input type="checkbox"/> Torque Waves in Extrusion    | <input type="checkbox"/> Drawing        | <input type="checkbox"/> Out of Calibration              |   |   |  |  |  |  |  |
| <input type="checkbox"/> Turning Sequence             | <input type="checkbox"/> Finish         | <input type="checkbox"/> Out of Sequence                 |   |   |  |  |  |  |  |
| <input type="checkbox"/> Wave/Twist in Tube           | <input type="checkbox"/> Folio          | <input type="checkbox"/> Outside Dimensions              |   |   |  |  |  |  |  |

# Work Order ID 95142

**\*95142\***

Page 3

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13

Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 1/25/13

Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Run Start

**\*NR1\***

Stop

**\*NR2\***

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

150

QC5- Inspect part completeness to step on W/O

0.00

**\*150\***

QC

Memo

0.00

Quality Control

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

160

0.00

**\*160\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

1- CLEAN CROSSTUBE WITH WASH'N WIPE

180

Outsource process - NDT per QSI038 4.1

0.00

**\*180\***

Outsource2

Memo

0.00

Outsource process - NDT

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Liquid Penetrant Inspection as per QSI 038

Issue P/O: 18975 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

DAS  
05  
0-89

13-01-29

CX 13/01/29 (1)

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause    | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling |      |      |     |   |                   |                    |             |              |              |
| Operator      |      |      |     |   |                   |                    |             |              |              |
| Material      |      |      |     |   |                   |                    |             |              |              |
| Setup         |      |      |     |   |                   |                    |             |              |              |
| Other         |      |      |     |   |                   |                    |             |              |              |
| Process       |      |      |     |   |                   |                    |             |              |              |
| Supplier      |      |      |     |   |                   |                    |             |              |              |
| Training      |      |      |     |   |                   |                    |             |              |              |
| Unapproved    |      |      |     |   |                   |                    |             |              |              |

**FAULT CATEGORY**

| Landing Gear  | General                                 | Other  |
|---|---|--|
| <input type="checkbox"/> Bending                      | <input type="checkbox"/> Bend           | <input type="checkbox"/> Grain                           |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route      | <input type="checkbox"/> Hardware                        |
| <input type="checkbox"/> Cracks                       | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete           |
| <input type="checkbox"/> Crushed/Crimped              | <input type="checkbox"/> Burrs          | <input type="checkbox"/> Instructions Incomplete/Unclear |
| <input type="checkbox"/> Cuffs                        | <input type="checkbox"/> Contamination  | <input type="checkbox"/> Maintenance                     |
| <input type="checkbox"/> Heat Treat                   | <input type="checkbox"/> Countersink    | <input type="checkbox"/> Mislabeled                      |
| <input type="checkbox"/> Inspection Strip in Tube     | <input type="checkbox"/> Cut Too Short  | <input type="checkbox"/> Misread                         |
| <input type="checkbox"/> Ripples in Bend              | <input type="checkbox"/> Drill Holes    | <input type="checkbox"/> Offset                          |
| <input type="checkbox"/> Torque Waves in Extrusion    | <input type="checkbox"/> Drawing        | <input type="checkbox"/> Out of Calibration              |
| <input type="checkbox"/> Turning Sequence             | <input type="checkbox"/> Finish         | <input type="checkbox"/> Out of Sequence                 |
| <input type="checkbox"/> Wave/Twist in Tube           | <input type="checkbox"/> Folio          | <input type="checkbox"/> Outside Dimensions              |
|   |   | <input type="checkbox"/> Ovalized                        |
|   |   | <input type="checkbox"/> Over/Under tolerance            |
|   |   | <input type="checkbox"/> Part Incorrect                  |
|   |   | <input type="checkbox"/> Part Lost/Missing               |
|   |   | <input type="checkbox"/> Part Moved                      |
|   |   | <input type="checkbox"/> Positioned Wrong                |
|   |   | <input type="checkbox"/> Power Loss/Surge                |
|   |   | <input type="checkbox"/> Pressure/Forced                 |
|   |   | <input type="checkbox"/> Temperature/Cure                |
|   |   | <input type="checkbox"/> Weld                            |
|   |   | <input type="checkbox"/> Wrong Stock Pulled              |
|   |   | <input type="checkbox"/> Other                           |

# Work Order ID 95142

**\*95142\***

Page 4

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                                 | Operation<br>Description   | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp                             |
|--|--|----------------------|---------|--------|--------------|---------------|---------------|------------------|--|
| 190<br><b>*190*</b><br>Packaging<br>Packaging                  | Packaging<br><br>Memo<br>*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***<br><br>Ensure copy of NDT results attached to work order.  | 0.00<br><br>0.00     |         |        |              | <u>1X</u>     |               |                  | <u>GP</u><br><u>13-01-31</u>               |
| 200<br><b>*200*</b><br>QC<br>Quality Control                   | QC5- Inspect part completeness to step on W/O<br><br>Memo<br>*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***<br><br>Inspect for damage & ensure results are as per Dwg D412-664-209 | 0.00<br><br>0.00     |         |        |              | <u>1</u>      |               |                  | <u>DAS</u><br><u>05</u><br><u>13-01-31</u> |
| 204<br><b>*204*</b><br>HandFXtube<br>Hand Finishing Crosstubes | <br><br>Memo<br>*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***<br><br>1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION                      | 0.00<br><br>0.00     |         |        |              | <u>RM</u>     |               |                  | <u>13-01-29</u>                            |

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause    | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling |      |      |     |   |                   |                    |             |              |              |
| Operator      |      |      |     |   |                   |                    |             |              |              |
| Material      |      |      |     |   |                   |                    |             |              |              |
| Setup         |      |      |     |   |                   |                    |             |              |              |
| Other         |      |      |     |   |                   |                    |             |              |              |
| Process       |      |      |     |   |                   |                    |             |              |              |
| Supplier      |      |      |     |   |                   |                    |             |              |              |
| Training      |      |      |     |   |                   |                    |             |              |              |
| Unapproved    |      |      |     |   |                   |                    |             |              |              |

**FAULT CATEGORY**

| Landing Gear  | General                                 | Other  | Other   |
|---|---|--|---|
| <input type="checkbox"/> Bending                      | <input type="checkbox"/> Bend           | <input type="checkbox"/> Grain                           | <input type="checkbox"/> Ovalized             |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route      | <input type="checkbox"/> Hardware                        | <input type="checkbox"/> Over/Under tolerance |
| <input type="checkbox"/> Cracks                       | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete           | <input type="checkbox"/> Part Incorrect       |
| <input type="checkbox"/> Crushed/Crimped.             | <input type="checkbox"/> Burrs          | <input type="checkbox"/> Instructions Incomplete/Unclear | <input type="checkbox"/> Part Lost/Missing    |
| <input type="checkbox"/> Cuffs                        | <input type="checkbox"/> Contamination  | <input type="checkbox"/> Maintenance                     | <input type="checkbox"/> Part Moved           |
| <input type="checkbox"/> Heat Treat                   | <input type="checkbox"/> Countersink    | <input type="checkbox"/> Mislabelled                     | <input type="checkbox"/> Positioned Wrong     |
| <input type="checkbox"/> Inspection Strip in Tube     | <input type="checkbox"/> Cut Too Short  | <input type="checkbox"/> Misread                         | <input type="checkbox"/> Power Loss/Surge     |
| <input type="checkbox"/> Ripples in Bend              | <input type="checkbox"/> Drill Holes    | <input type="checkbox"/> Offset                          | <input type="checkbox"/> Pressure/Forced      |
| <input type="checkbox"/> Torque Waves in Extrusion    | <input type="checkbox"/> Drawing        | <input type="checkbox"/> Out of Calibration              | <input type="checkbox"/> Temperature/Cure     |
| <input type="checkbox"/> Turning Sequence             | <input type="checkbox"/> Finish         | <input type="checkbox"/> Out of Sequence                 | <input type="checkbox"/> Weld                 |
| <input type="checkbox"/> Wave/Twist in Tube           | <input type="checkbox"/> Folio          | <input type="checkbox"/> Outside Dimensions              | <input type="checkbox"/> Wrong Stock Pulled   |
|   |   |  | <input type="checkbox"/> Other                |



# Work Order ID 95142

\*95142\*

Page 5

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 \*1\*

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00 \*1\*

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start \*NR1\*

QC: Date: SPC (Y/N): Date:

Stop \*NR2\*

| Sequence ID/<br>Work Center ID           | Operation<br>Description   | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp             |
|--|--|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------------------|
| 206<br>*206*<br>QC<br>Quality Control    | QC7-Inspect Chemical Conversion Coat<br><br>Memo<br>*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***   | 0.00<br><br>0.00     |         |        |              | 1             |               |                  | DAS<br>05 13-01-31<br>9-89 |
| 210<br>*210*<br>Crosstubes<br>Crosstubes | Crosstubes<br><br>Memo<br>*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***<br><br>1-Rivet Cuffs as per Dwg D412-664-249, with Sika flex in Between tube & Cuff<br>A/R SIKAFLEX -241/-291 BATCH: 123944 | 0.00<br><br>0.00     |         |        |              | 1             | 0             | 0                | 13-2-1                     |
| 215<br>*215*<br>QC<br>Quality Control    | QC5- Inspect part completeness to step on W/O<br><br>Memo  | 0.00<br><br>0.00     |         |        |              | 1             |               |                  | 13-02-01                   |

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause                             | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling <input type="checkbox"/> |      |      |     |   |                   |                    |             |              |              |
| Operator <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Material <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Setup <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Other <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Process <input type="checkbox"/>       |      |      |     |   |                   |                    |             |              |              |
| Supplier <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Training <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Unapproved <input type="checkbox"/>    |      |      |     |   |                   |                    |             |              |              |

**FAULT CATEGORY**

|  |   |  |
|--|---|--|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions<br><br><input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge<br><br><input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><br><input type="checkbox"/> Other |
|--|---|--|

**Work Order ID 95142****\*95142\***

Page 6

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description                                      | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 220                            | SprayPaint  | 0.00                 |         |        |              |               |               |                  |                |
| <b>*220*</b>                   |   |                      |         |        |              |               |               |                  |                |
| SprayPaint                     | Memo  | 0.00                 |         |        |              |               |               |                  |                |
| Spray Painting                 | *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***              |                      |         |        |              |               |               |                  |                |
|                                | ***Mask underside of crosstube as shown***                    |                      |         |        |              |               |               |                  |                |
|                                | 1-Prime inside and outside crosstube as per QSI 005 4.2       |                      |         |        |              |               |               |                  |                |
|                                | 2-Paint outside crosstube with White Imron as per QSI 005 4.2 |                      |         |        |              |               |               |                  |                |
|                                | PRIME: 124403   |                      |         |        |              |               |               |                  |                |
|                                | Start Time: 11:20   |                      |         |        |              |               |               |                  |                |
|                                | Finish Time: 12:00  |                      |         |        |              |               |               |                  |                |
|                                | PAINT: 129074   |                      |         |        |              |               |               |                  |                |
|                                | Start Time: 4:00  |                      |         |        |              |               |               |                  |                |
|                                | Finish Time: 4:40   |                      |         |        |              |               |               |                  |                |
| 230                            | QC14- Inspect Spray Paint                                     | 0.00                 |         |        |              |               |               |                  |                |
| <b>*230*</b>                   |   |                      |         |        |              |               |               |                  |                |
| QC                             | Memo  | 0.00                 |         |        |              |               |               |                  |                |
| Quality Control                | Then, Wrap in plastic bag to protect from scratches           |                      |         |        |              |               |               |                  |                |

DAS  
1/1/13  
13.02.05

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |      |      |   |   |                   |   |             |              |  |  |   |  |
|--|------|------|---|---|-------------------|---|-------------|--------------|--|--|---|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____   |      |      |   | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                   | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |             |              |  |  |   |  |
| <b>Root Cause</b>  | Date | Step | Qty   | Description of work order update or Non-conformance   | Initial Chief Eng | Action Description  | Sign & Date | Verification | QC Inspector   |  |   |  |
| Doc/Data <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Equip/Tooling <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Operator <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Material <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Setup <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Other <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Process <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Supplier <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Training <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Unapproved <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| <b>FAULT CATEGORY</b>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube |      |      | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio |   |                   | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabelled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions  |             |              | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge |  | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |  |

# Work Order ID 95142

**\*95142\***

Page 7

January-02-13 2:19:38 PM

Item ID: D412-664-209

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description  | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 240                            | Crosstubes  | 0.00                 |         |        |              |               |               |                  |                |
| <b>*240*</b>                   |   |                      |         |        |              |               |               |                  |                |
| Crosstubes                     |   |                      |         |        |              |               |               |                  |                |
| Crosstubes                     | <p>Memo</p> <p>1- Install chafing shield as per DEO D412-664-249. Top holes should be facing up.</p> <p>A/R Proseal 890 Batch: <u>124028</u></p> <p>EXP: <u>7/13</u></p> <p>2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe</p> <p>3- Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D12-664-249 using installation jig DT9024. Torque clamps as per dwg</p> <p>A/R Scotch-Weld DP460 Batch: <u>122900</u></p> <p>EXP: <u>1-9-13</u></p> <p>4- Install nut plates as per Dwg D412-664-249 Touch-up rivet heads with Imron paint.</p> | 0.00                 |         |        |              |               |               |                  | <p>13-2-3</p>  |
| 250                            | QC5- Inspect part completeness to step on W/O   | 0.00                 |         |        |              |               |               |                  |                |
| <b>*250*</b>                   |   |                      |         |        |              |               |               |                  |                |
| QC                             |   |                      |         |        |              |               |               |                  |                |
| Quality Control                | <p>Memo</p> <p>13.25</p>  | 0.00                 |         |        |              |               |               |                  |                |

255

Pick Kit

88 13-2-6.

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |      |      |   |   |                   |   |             |              |  |  |   |  |
|--|------|------|---|---|-------------------|---|-------------|--------------|--|--|---|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____   |      |      |   | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                   | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |             |              |  |  |   |  |
| Root Cause   | Date | Step | Qty   | Description of work order update or Non-conformance   | Initial Chief Eng | Action Description  | Sign & Date | Verification | QC Inspector   |  |   |  |
| Doc/Data <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Equip/Tooling <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Operator <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Material <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Setup <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Other <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Process <input type="checkbox"/>   |      |      |   |   |                   |   |             |              |  |  |   |  |
| Supplier <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Training <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| Unapproved <input type="checkbox"/>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| <b>FAULT CATEGORY</b>  |      |      |   |   |                   |   |             |              |  |  |   |  |
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube |      |      | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio |   |                   | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions   |             |              | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge |  | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><br><input type="checkbox"/> Other |  |

**Work Order ID 95142****\*95142\***

Page 8

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Item ID: D412-664-209

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13 Start Qty: 1.00 **\*1\***

Cust Item ID:

Required Date: 1/25/13 Req'd Qty: 1.00 **\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                | Operation<br>Description  | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|---|---|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 260<br><b>*260*</b><br>QC<br>Quality Control  | QC4- 100% Inspect kits for completeness<br><br>Memo                             | 0.00<br><br>0.00     |         |        |              | 1             |               |                  |                |
| 270<br><b>*270*</b><br>Packaging<br>Packaging | Packaging<br><br>Memo<br>Identify and pack for shipping as per PPP D412-664-209 | 0.00<br><br>0.00     |         |        |              |               |               |                  |                |
| 280<br><b>*280*</b><br>QC<br>Quality Control  | QC21- Final Inspection - Work Order Release<br><br>Memo                         | 0.00<br><br>0.00     |         |        |              |               |               |                  |                |

DAS  
15  
8-89

13-27

12/2/13

13/2/14

MF

13-2-B

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |      |      |   |   |                      |   |                |              |   |  |  |
|--|------|------|---|---|----------------------|---|----------------|--------------|---|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____   |      |      |   | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                      | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                |              |   |  |  |
| <b>Root Cause</b>  | Date | Step | Qty   | Description of work order update<br>or Non-conformance  | Initial<br>Chief Eng | Action<br>Description   | Sign &<br>Date | Verification | QC Inspector  |  |  |
| Doc/Data <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| Equip/Tooling <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |   |  |  |
| Operator <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| Material <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| Setup <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |   |  |  |
| Other <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |   |  |  |
| Process <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |   |  |  |
| Supplier <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| Training <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| Unapproved <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |   |  |  |
| <b>FAULT CATEGORY</b>  |      |      |   |   |                      |   |                |              |   |  |  |
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube |      |      | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio |   |                      | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions   |                |              | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge<br><br><input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><br><input type="checkbox"/> Other |  |  |



January-02-13 2:19:33 PM

**Parent Item Name:** Crosstube Low Standard Aft

**Required Date: 1/25/13**

**Start Qty: 1.00**

**Required Qty: 1.00**

**Comments:** IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by EC  
 IPP Rev:C ECN 1121 08-02-25 DD verified by:EC  
 IPP Rev:D 08-06-12 add comment in seq. 24 DD verified  
 by:EC  
 664-249-B-2 DD verf:EC

IPP REV:E 11.10.03 DEO D412-

| Component Item ID/<br>Item Name | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand  | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|-----------------|-------------|--------------|---------------|----------------|--------|
| AN6-40A<br>Bolt                 |                        | Purchased     | No          |                     |                  | 260             | Each               | 80.0000         | 4           | 4            |               |                | SP     |
|                                 |                        |               |             | <u>Location</u>     |                  | <u>Loc Qty</u>  |                    | <u>Loc Code</u> |             |              |               |                |        |
|                                 |                        |               |             | ST340               |                  | 80              |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 123021              |                  | 30              |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 123900              |                  | 50              |                    |                 |             |              |               |                |        |
| AN6-41A<br>Bolt                 |                        | Purchased     | No          |                     |                  | 260             | Each               | 44.0000         | 2           | 2            |               |                | SP     |
|                                 |                        |               |             | <u>Location</u>     |                  | <u>Loc Qty</u>  |                    | <u>Loc Code</u> |             |              |               |                |        |
|                                 |                        |               |             | ST340               |                  | 44              |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 122407              |                  | 19              |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 123522              |                  | 25              |                    |                 |             |              |               |                |        |
| AN960JD616<br>Washer            | NAS1149D0663J          | Purchased     | No          |                     |                  | 100             | Each               | 0.0000          | 18          | 18           |               |                | SP     |
| CR3212-4-07<br>CHERRY RIVET     |                        | Purchased     | No          |                     |                  | 240             | Each               | 325.0000        | 44          | 44           |               |                | 13-2-1 |
|                                 |                        |               |             | <u>Location</u>     |                  | <u>Loc Qty</u>  |                    | <u>Loc Code</u> |             |              |               |                |        |
|                                 |                        |               |             | ST328               |                  | 325             |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 104071              |                  | 10              |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 109840              |                  | 267             |                    |                 |             |              |               |                |        |
|                                 |                        |               |             | 122378              |                  | 48              |                    |                 |             |              |               |                |        |

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |      |      |   |   |                      |   |                |              |  |  |   |
|--|------|------|---|---|----------------------|---|----------------|--------------|--|--|---|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____   |      |      |   | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> |                      | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                |              |  |  |   |
| <b>Root Cause</b>  | Date | Step | Qty   | Description of work order update<br>or Non-conformance  | Initial<br>Chief Eng | Action<br>Description   | Sign &<br>Date | Verification | QC Inspector   |  |   |
| Doc/Data <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| Equip/Tooling <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |  |  |   |
| Operator <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| Material <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| Setup <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |  |  |   |
| Other <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |  |  |   |
| Process <input type="checkbox"/>   |      |      |   |   |                      |   |                |              |  |  |   |
| Supplier <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| Training <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| Unapproved <input type="checkbox"/>  |      |      |   |   |                      |   |                |              |  |  |   |
| <b>FAULT CATEGORY</b>  |      |      |   |   |                      |   |                |              |  |  |   |
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube |      |      | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio |   |                      | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructor's Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions   |                |              | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge |  | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |

# Picklist Print

January-02-13 2:19:34 PM

Page 2

Work Order ID: 95142

Parent Item: D412-664-209

Parent Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13

Required Date: 1/25/13

Start Qty: 1.00

Required Qty: 1.00

D2896-1  
Support

Manufactured No

240 Each 33.0000

1 1

AB 13-2-2

Location

Loc Qty

Loc Code

LG053

33

74465

8

86663

12

88695

7

90378

6

①

D3189-1  
Chafing Shield(send DSI9629 with spares)

Manufactured No

240 Each 44.0000

2 2

AB 13-2-2

Location

Loc Qty

Loc Code

FG

4

36065

4

LG053

40

89901

4

90618

20

91673

16

②

D3595-063-570  
RUBBER CUSHION

Manufactured No

240 Each 161.0000

2 2

AB 13-2-2

Location

Loc Qty

Loc Code

FG

10

42243

10

LG051

108

71534

1

76546

2

83294

105

LG055

43

92940

43

②

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause                             | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling <input type="checkbox"/> |      |      |     |   |                   |                    |             |              |              |
| Operator <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Material <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Setup <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Other <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Process <input type="checkbox"/>       |      |      |     |   |                   |                    |             |              |              |
| Supplier <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Training <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Unapproved <input type="checkbox"/>    |      |      |     |   |                   |                    |             |              |              |

**FAULT CATEGORY**

|   |   |  |
|---|---|--|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabelled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions |
|   |   | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge   |
|   |   | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other  |

# Picklist Print

January-02-13 2:19:34 PM

Work Order ID: 95142

Parent Item: D412-664-209

Parent Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13

Required Date: 1/25/13

Start Qty: 1.00

Required Qty: 1.00

D3660-1  
CUFF

Manufactured No

220 Each 12.0000 2 2

Location

Loc Qty

Loc Code

ST482

12

53501

1

89249

5

93920

6

①

TW 13-01-24

D412-664-209TRN

Crosstube Turning Detail

Manufactured No

140 Each 3.0000 1 1

Location

Loc Qty

Loc Code

LG014

3

63235

1

63236

1

94358

1

①

MO 13/01/23

MS21042L6  
Nut

Purchased No

260 Each 663.0000 6 6

①

Sp 13-02-6

Sho

Location

Loc Qty

Loc Code

ST314

663

117677

25

118927

48

120308

71

122441

19

123248

350

123355

150

60k

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause    | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|---------------|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling |      |      |     |   |                   |                    |             |              |              |
| Operator      |      |      |     |   |                   |                    |             |              |              |
| Material      |      |      |     |   |                   |                    |             |              |              |
| Setup         |      |      |     |   |                   |                    |             |              |              |
| Other         |      |      |     |   |                   |                    |             |              |              |
| Process       |      |      |     |   |                   |                    |             |              |              |
| Supplier      |      |      |     |   |                   |                    |             |              |              |
| Training      |      |      |     |   |                   |                    |             |              |              |
| Unapproved    |      |      |     |   |                   |                    |             |              |              |

### FAULT CATEGORY

|   |   |  |  |   |
|---|---|--|--|---|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabelled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><br><input type="checkbox"/> Other |
|---|---|--|--|---|

# Picklist Print

January-02-13 2:19:35 PM

Page 4

Work Order ID: 95142

Parent Item: D412-664-209

Parent Item Name: Crosstube Low Standard Aft

Start Date: 1/02/13

Required Date: 1/25/13

Start Qty: 1.00

Required Qty: 1.00

MS21920-28

Purchased

No

240

Each

73.0000

4

4

Clamp(per MIL-DTL-8783C)

124260

4 4 AL 13-2-2

Location

Loc Qty

Loc Code

FG

5

105884

5

LG050

56

118713

3

120054

2

122518

1

123674

50

LG051

12

121440

8

122204

2

123243

2

MS21920-30

Purchased

No

240

Each

83.0000

2

2

clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG050

51

119529

1

123240

50

LG051

32

111258

14

121583

18

2 2 AL 13-2-2

2

January-02-13 2:19:35 PM

Shop Packet Print

Page 4

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|  |   |   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
|--|---|---|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--|----------------------------------|--|------------------------------------|--|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                           | Crosstube <input type="checkbox"/>  | Water Jet <input type="checkbox"/>  | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                           | Small Fab <input type="checkbox"/>  | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                       | Finishing <input type="checkbox"/>  | Rec/Store/Packaging <input type="checkbox"/>  | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                           | Composite <input type="checkbox"/>  | Supplier <input type="checkbox"/>   |                                      |                                    |                                    |                                      |                                    |                                    |  |                                  |  |                                    |  |                                |                                    |                                    |                                   |  |

| Root Cause                             | Date | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description | Sign & Date | Verification | QC Inspector |
|--|------|------|-----|---|-------------------|--------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Equip/Tooling <input type="checkbox"/> |      |      |     |   |                   |                    |             |              |              |
| Operator <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Material <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Setup <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Other <input type="checkbox"/>         |      |      |     |   |                   |                    |             |              |              |
| Process <input type="checkbox"/>       |      |      |     |   |                   |                    |             |              |              |
| Supplier <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Training <input type="checkbox"/>      |      |      |     |   |                   |                    |             |              |              |
| Unapproved <input type="checkbox"/>    |      |      |     |   |                   |                    |             |              |              |

**FAULT CATEGORY**

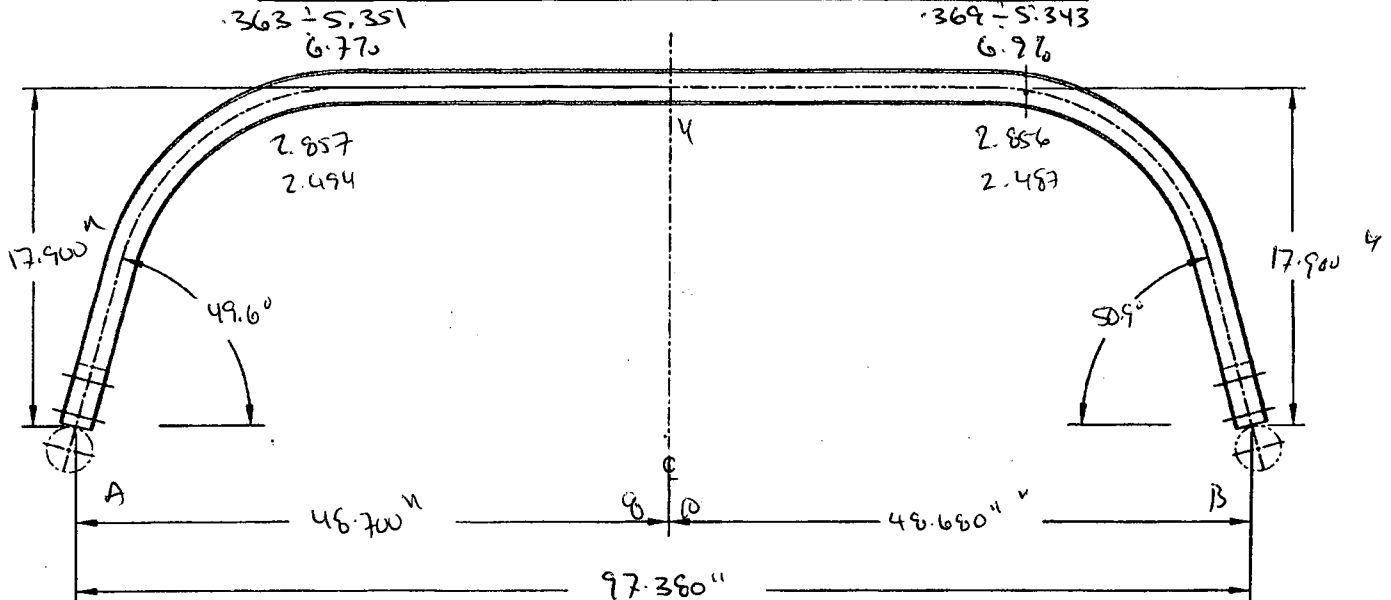
|  |   |  |  |   |
|--|---|--|--|---|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabellec<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |
|--|---|--|--|---|



|   |  |                     |                     |
|---|--|---------------------|---------------------|
| <b>DART AEROSPACE LTD</b>                         |  | <b>Work Order:</b>  |                     |
| <b>Description:</b> Crosstube Low Aft (412)       |  | <b>Part Number:</b> | <b>D412-664-209</b> |
| <b>Inspection Dwg:</b> D412-664-249 <b>Rev:</b> B |  | <b>Page 1 of 1</b>  |                     |

| Required Dimension | Min   | Max      |
|--------------------|-------|----------|
| Height             | 17.78 | 18.04    |
| 1/2 Span           | 48.55 | 48.81    |
| Angle              | 49    | 52       |
| Total Span         | 97.1  | 97.62    |
| Bending Passes     | 8     | --       |
| Crushing           | --    | 6% / 10% |

95142  
P/B-01-7



|                                     | Side A | Middle | Side B |
|-------------------------------------|--------|--------|--------|
| <b>Bending Passes</b>               | 8      | 11     | 10     |
| <b>Crushing</b>                     | 6.77%  |        | 6.97%  |
| <b>Comments</b>                     |        |        |        |
| Side A = 6.77% crushing @ 8 Passes  |        |        |        |
| Middle = 11 Passes                  |        |        |        |
| Side B = 6.97% crushing @ 10 Passes |        |        |        |

|                 |                   |
|-----------------|-------------------|
| QC15 Inspection | <b>DAS</b>        |
| Date            | <b>16</b> 13/1/24 |

| Rev | Date     | Change                             | Revised by | Approved |
|-----|----------|------------------------------------|------------|----------|
| A   | 08.02.29 | New Issue                          | KJ/JM      |          |
| B   | 12.04.16 | Added bending, crushing dimensions | KJ         |          |

| Item | Qty  | Part Number       | Description   |
|------|------|-------------------|---|
|      | -249 |                   |   |
| 1    | X    | D412-664-249      | CROSSTUBE ASSEMBLY (412 LOW AFT)  |
| 2    | 1    | D6009-129         | CROSSTUBE   |
| 3    | 2    | D2856-600-1009    | ABRASION STRIP  |
| 4    | 1    | D2896-1           | SUPPORT   |
| 5    | 2    | D3189-1           | CHAFING SHIELD  |
| 6    | 2    | D3595-063-570     | RUBBER CUSHION  |
| 7    | 2    | D3660-1           | CUFF  |
| 8    | 44   | CR3212-4-07       | RIVET (OR M7885/3-4-07)   |
| 9    | 4    | MS21920-28        | CLAMP   |
| 10   | 2    | MS21920-30        | CLAMP (OR MS21920-32)   |
| 11   | A/R  | MAGNOBOND 6398    | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
| 12   | A/R  | SIKAFLEX-241/-291 | SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)   |

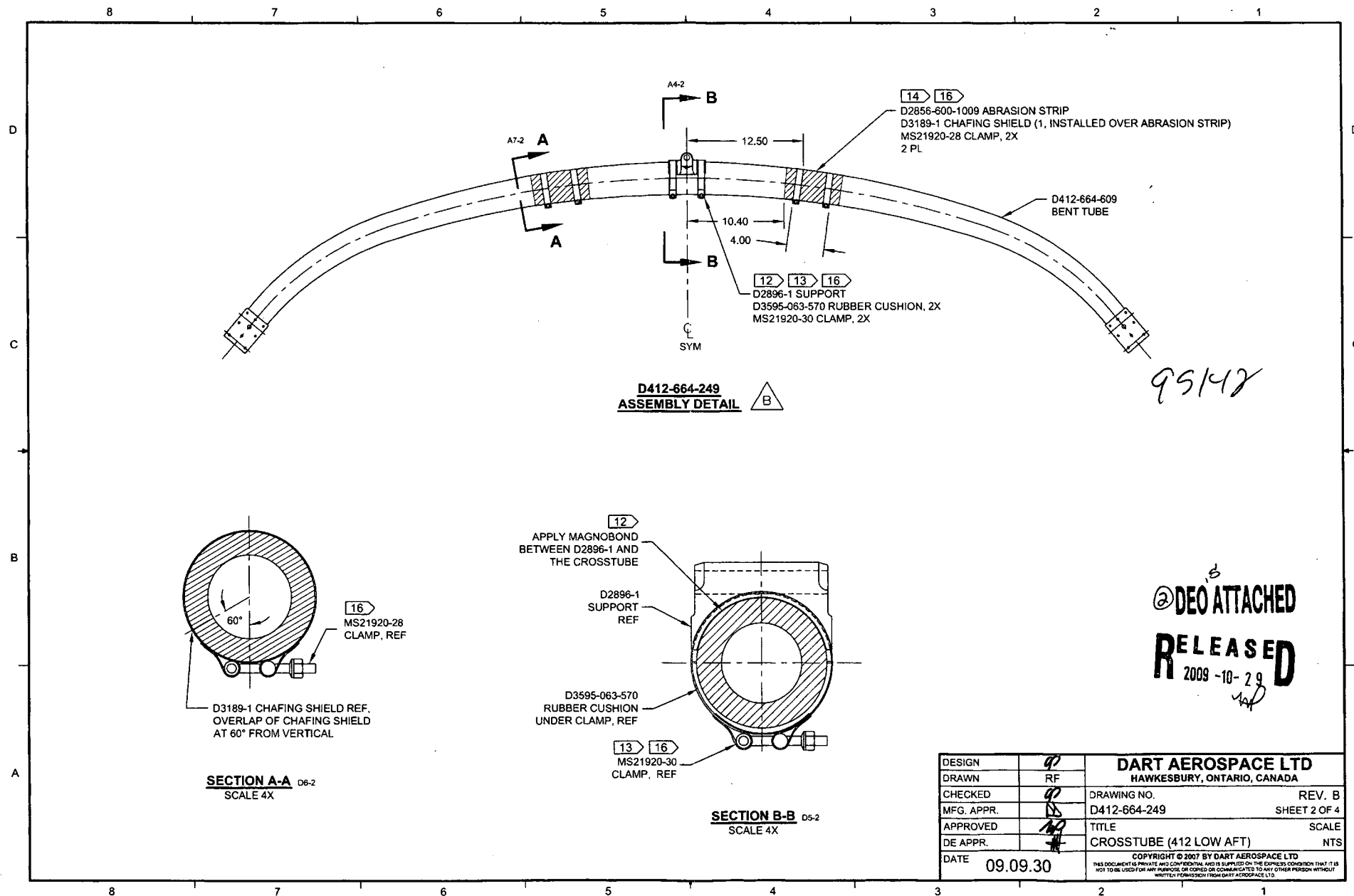
# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 127.826±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-249" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 42.5 lbs (PER IN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 17) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 18) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

95142  
R/13-01-7

DEO ATTACHED  
RELEASED  
2009-10-28

|  |   |   |          |
|--|---|---|----------|
| B  | REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS | RF  | 09.09.30 |
| A  | NEW ISSUE   | CP  | 07.07.07 |
| REV.   | DESCRIPTION                                       | BY  | DATE     |
| DESIGN   | RF  | DART AEROSPACE LTD<br>HAWKESBURY, ONTARIO, CANADA |          |
| DRAWN  | RF  | DRAWING NO. REV. B                                |          |
| CHECKED  | RF  | D412-664-249 SHEET 1 OF 4                         |          |
| MFG. APPR.   | RF  | TITLE SCALE                                       |          |
| APPROVED   | RF  | CROSSTUBE (412 LOW AFT) NTS                       |          |
| DE APPR.   | RF  | DATE 09.09.30                                     |          |
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2 DEO ATTACHED  
RELEASED  
2009-10-29



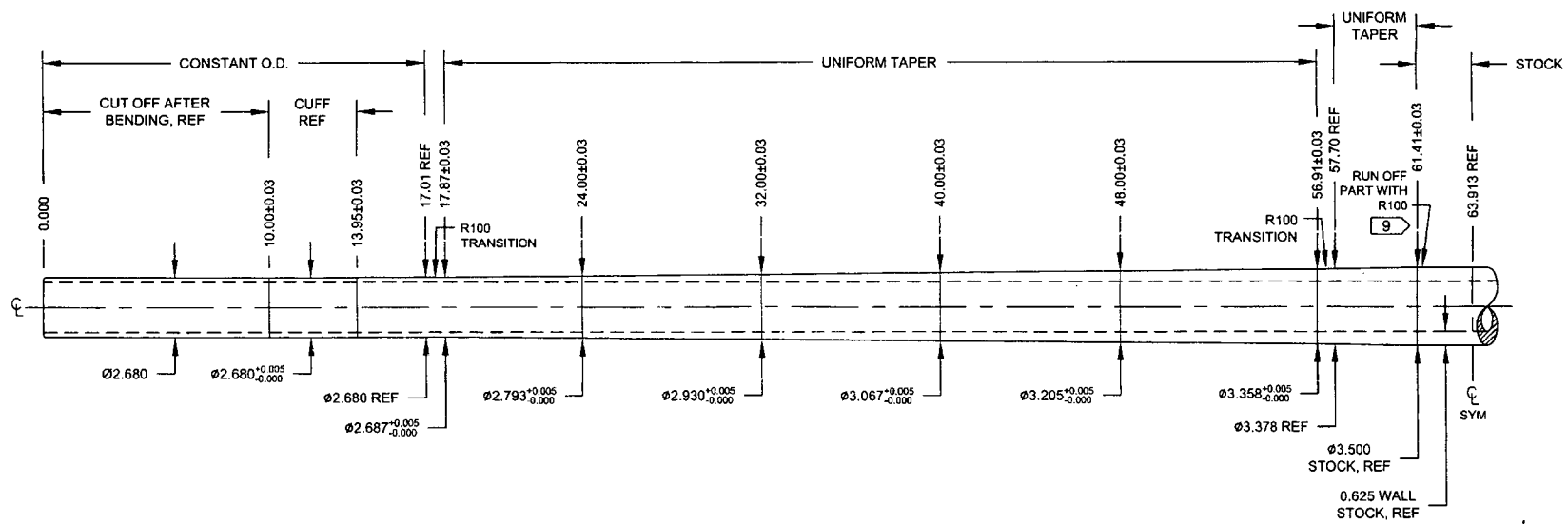
8 7 6 5 4 3 2 1

D

C

B

A



**D412-664-249TRN**  
**TURNING DETAIL**

DEO ATTACHED

**RELEASED**  
2009-10-29  
JMP

95142

|  |          |  |              |
|--|----------|--|--------------|
| DESIGN   | 42       | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN  | RF       | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED  | 42       | DRAWING NO.                            | REV. B       |
| MFG. APPR.   | 42       | D412-664-249                           | SHEET 4 OF 4 |
| APPROVED   | 42       | TITLE                                  | SCALE        |
| DE APPR.   | 42       | CROSSTUBE (412 LOW AFT)                | NTS          |
| DATE   | 09.09.30 | COPYRIGHT © 2007 BY DART AEROSPACE LTD |              |
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8 7 6 5 4 3 2 1

|                             |  |                        |   |  |                                |                           |              |
|-----------------------------|--|------------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE ASS'Y (412 LOW AFT) | REV. B                 | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D412-664-249-B-1 | SHEET NO.<br>SHEET 1 OF 2 | SCALE<br>NTS |
| DRAWN<br><i>q</i>           | CHECKED<br><i>Sc</i>                   | MFG. APPR.<br><i>R</i> | APPROVED<br><i>MD</i>                   |  | DE APPR.<br><i>MD</i>          |                           |              |
| DATE<br>11.05.25            | DATE<br>11.05.31                       | DATE<br>11.05.31       | DATE<br>11/25/31                        |  | DATE<br>11.05.31               |                           |              |

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

| Item | Qty<br>-249 | Part Number    | Description    |
|------|-------------|----------------|----------------|
| 3    | 0           | D2856-600-1009 | ABRASION STRIP |

**WAS:**

|   |   |                |                |
|---|---|----------------|----------------|
| 3 | 2 | D2856-600-1009 | ABRASION STRIP |
|---|---|----------------|----------------|

NOTE 14, SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

**WAS:**

- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

**RELEASED**  
2011-07-14  
*MD*

*95142*

|                             |  |                     |   |  |                                |                           |              |
|-----------------------------|--|---------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE ASS'Y (412 LOW AFT) | REV. B              | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D412-664-249-B-1 | SHEET NO.<br>SHEET 2 OF 2 | SCALE<br>NTS |
| DRAWN <i>q2</i>             | CHECKED <i>Sc</i>                      | MFG. APPR. <i>B</i> | APPROVED <i>MD</i>                      |  | DE APPR. <i>#</i>              |                           |              |
| DATE 11.05.25               | DATE 11.05.31                          | DATE 11.05.31       | DATE 11/05/31                           |  | DATE 11.05.31                  |                           |              |

**IS:**

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

D412-664-609  
BENT TUBE

**WAS:**

14 16

D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

D3189-1  
REF

C  
SYM

**D412-664-249  
ASSEMBLY DETAIL**

**RELEASED**  
2011-07-14  
*MD*

*95/42*

|                             |  |                     |   |  |                                |                           |              |
|-----------------------------|--|---------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE ASS'Y (412 LOW AFT) | REV. B              | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D412-664-249-B-2 | SHEET NO.<br>SHEET 1 OF 1 | SCALE<br>NTS |
| DRAWN <i>Q</i>              | CHECKED <i>ASS</i>                     | MFG. APPR. <i>E</i> | APPROVED <i>WAP</i>                     |  | DE APPR. <i>W</i>              |                           |              |
| DATE 11.09.07               | DATE 11.09.19                          | DATE 11.09.19       | DATE 11.09.19                           |  | DATE 11.09.19                  |                           |              |

**PURPOSE:**

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

**CHANGE:**

IS:

| Item | Qty<br>-249 | Part Number       | Description                    |
|------|-------------|-------------------|--------------------------------|
| 11   | A/R         | SCOTCH-WELD DP460 | EPOXY ADHESIVE, 3M SCOTCH-WELD |

WAS:

|    |     |                |   |
|----|-----|----------------|---|
| 11 | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023<br>ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,<br>TYPE II, CLASS 2 ADHESIVE) |
|----|-----|----------------|---|

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.**

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

95142  
**RELEASED**  
2011-09-28  
*MD*



|                             |                                  |                      |   |  |                                |                           |              |
|-----------------------------|----------------------------------|----------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE (412 LOW AFT) | REV. B               | <b>DART AEROSPACE LTD<br/>ENGINEERING ORDER</b> |  | D.E.O. NO.<br>D412-664-249-B-3 | SHEET NO.<br>SHEET 1 OF 3 | SCALE<br>NTS |
| DRAWN <i>q</i>              | CHECKED <i>j</i>                 | MFG. APPR. <i>DD</i> | APPROVED <i>AP</i>                              |  | DE APPR. <i>HH</i>             |                           |              |
| DATE 12.08.21               | DATE 12.08.30                    | DATE 12.08.30        | DATE 12.08.30                                   |  | DATE 12.08.30                  |                           |              |

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890. UPDATE INSTALLATION OF CHAFING SHIELDS AND REDUCE TORQUE TO 40-50 IN-LBS. THIS ENGINEERING ORDER SUPERCEDES DEO D412-664-249-B-1

**CHANGE:**

**PARTS LIST IS AMENDED AS FOLLOWS:**

**IS:**

| Item         | Qty<br>-249  | Part Number               | Description               |
|--------------|--------------|---------------------------|---------------------------|
| <del>3</del> | <del>0</del> | <del>D2856-600-1009</del> | <del>ABRASION STRIP</del> |

**WAS:**

|   |   |                |                |
|---|---|----------------|----------------|
| 3 | 2 | D2856-600-1009 | ABRASION STRIP |
|---|---|----------------|----------------|

**NOTE 14 AND 16 ON SHEET 1 IS AMENDED AS FOLLOWS:**

**IS:**

- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. **TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB.** ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**WAS:**

- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

**RELEASED**  
2012-09-04  
*MD*

*95142*

|                             |                                  |                     |   |                                |                           |              |
|-----------------------------|----------------------------------|---------------------|---|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE (412 LOW AFT) | REV. B              | DART AEROSPACE LTD<br>ENGINEERING ORDER | D.E.O. NO.<br>D412-664-249-B-3 | SHEET NO.<br>SHEET 2 OF 3 | SCALE<br>NTS |
| DRAWN <i>97</i>             | CHECKED <i>A</i>                 | MFG. APPR. <i>A</i> | APPROVED <i>MD</i>                      | DE APPR. <i>MD</i>             |                           |              |
| DATE 12.08.21               | DATE 12.08.22                    | DATE 12.08.29       | DATE 12.08.29                           | DATE 12.08.29                  |                           |              |

**IS:**

16 14  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

D412-664-609  
BENT TUBE

4.00  
CLAMP SPACING

4.38  
CHAFING SHIELD, REF

A

A

11.83  
TO CLAMP  
11.60  
TO  
CHAFING  
SHIELD

**WAS:**

14 16

D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

D3189-1  
REF

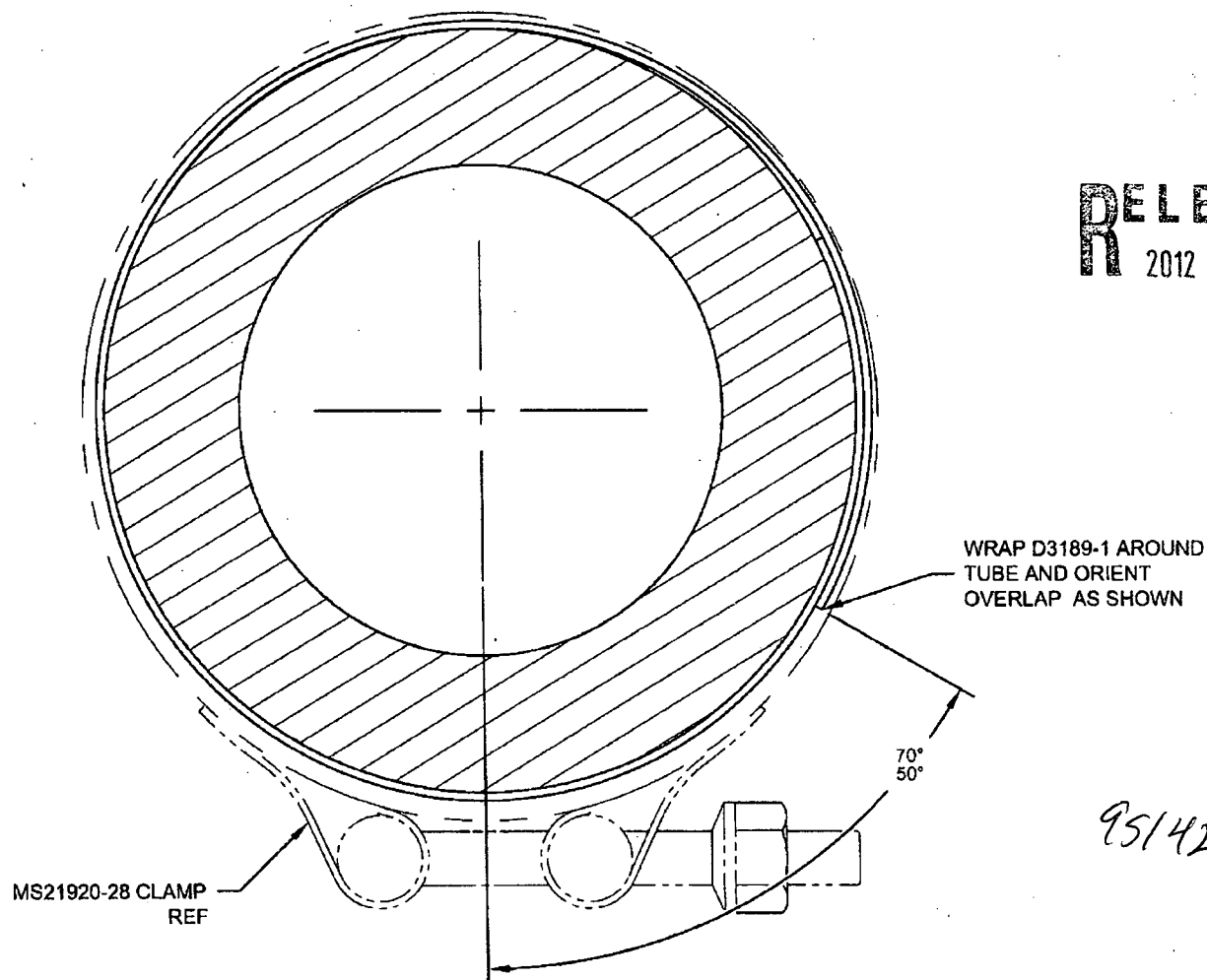
C  
SYM

**D412-664-249  
ASSEMBLY DETAIL**

95142  
**RELEASE**  
2012-09-04  
*MD*

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|                             |                                  |                      |   |  |                                |                           |              |
|-----------------------------|----------------------------------|----------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-249 | TITLE<br>CROSSTUBE (412 LOW AFT) | REV. B               | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D412-664-249-B-3 | SHEET NO.<br>SHEET 3 OF 3 | SCALE<br>NTS |
| DRAWN <i>gp</i>             | CHECKED <i>JA</i>                | MFG. APPR. <i>JA</i> | APPROVED <i>MD</i>                      |  | DE APPR. <i>MD</i>             |                           |              |
| DATE 12.08.21               | DATE 12.08.21                    | DATE 12.08.21        | DATE 12.08.21                           |  | DATE 12.08.21                  |                           |              |

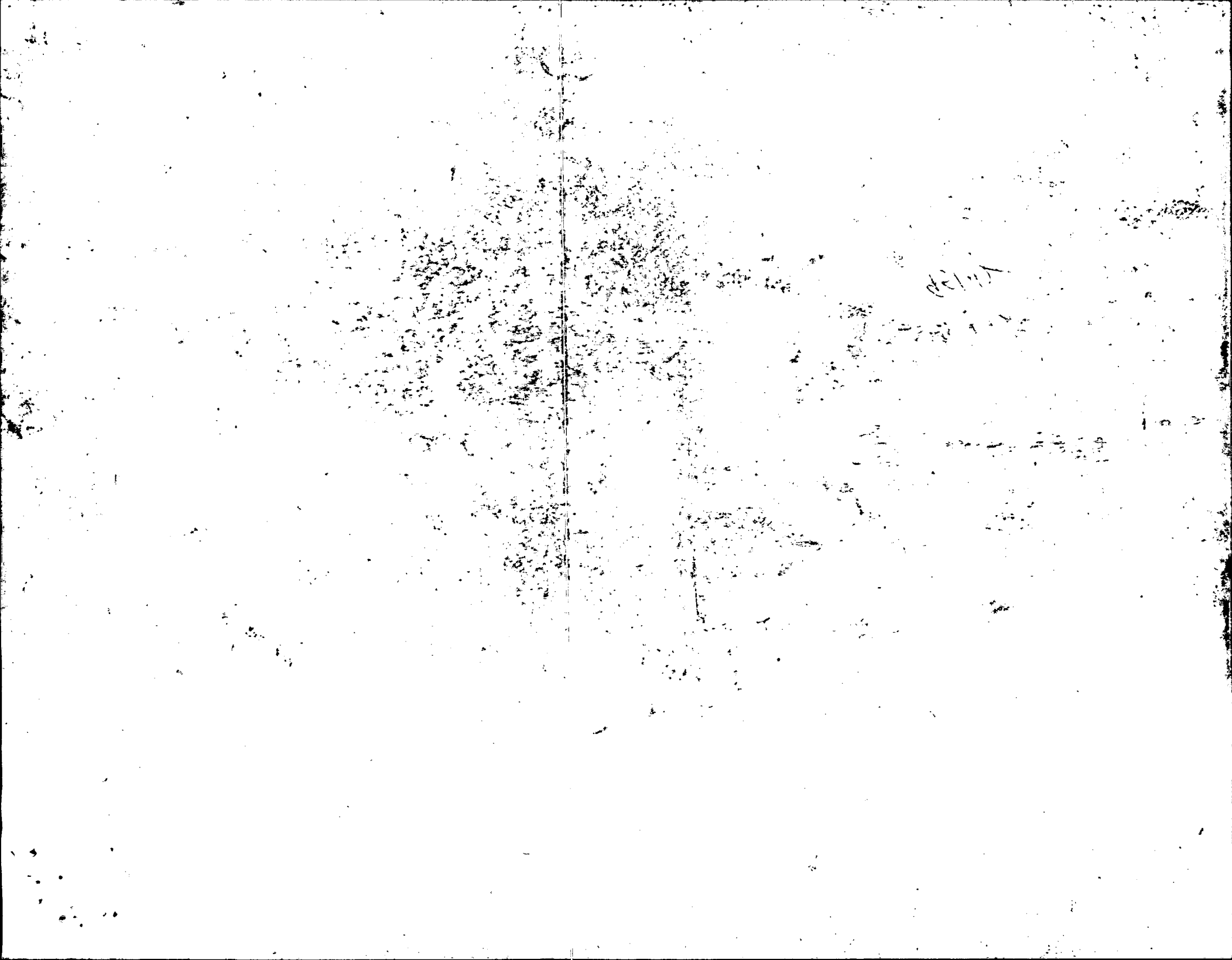


**SECTION A-A**  
CHAFING SHIELD DETAIL  
VIEW ROTATED, NOT TO SCALE

RELEASE  
R 2012-09-04  
U *MD*

95/42

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Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID **PO18975**

Purchase Order Date 1/29/13

PO Print Date 1/29/13

Page Number 3 of 3

**Order From :**

VC-ACU002

ACUREN  
2190 SPEERS ROAD  
OAKVILLE, ON L6L 2X8  
CA

**Contact Name**

**Vendor Phone**

613 931 1261

**Vendor Fax**

613 931 2777

**Vendor Account Nbr**

**Buyer**

Chantal Lavoie

**Requisition Nbr**

**Tax Resale Nbr**

10127-2607

**Terms**

Net 30

**Currency**

CAD

**FOB**

Destination-Collect

8

95142

D412-664-209  
CROSSTUBE

1/29/13

1.00 Yours ppd

\$98.8750

\$98.88

Yes

**Special Inst:** LIQUID PENETRANT INSPECTION AS  
PER QSI 038 OR  
LPI AS PER ASTM 1417 LEVEL 2

**PO Total:**

\$791.00

CERTIFICATE OF CONFORMITY  
REQ'D UPON DELIVERY

Change Nbr:

1

Change Date: 1/29/13

No substitution or deviation without  
consent.

Certificate of Conformity or Material  
Certification required **YES** NO





**E- 120273**

Form dated September 2010

Report #'s: AP FBI 100-100000

Vehicle #

Tues

Wed

W.O.#:

Camera #:

Thurs

Fr

Sat

188-13-C0010

| WELD INSPECTION SUMMARY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Weld Diameter           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Long Seam |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Client Representative:**

MT

**ACUREN 1-877-299-2857**

Cambridge, ON (519) 622-3112 • Fax (519) 622-1326  
Cantley, QC (819) 360-0685 • Fax (819) 827-3513  
Cornwall, ON (613) 931-1261 • Fax (613) 931-2777  
Gaspé, QC (418) 392-3618 • Fax (418) 392-4114  
Halifax, NS (902) 443-4448 • Fax (902) 445-5090  
Jonquière, QC (418) 542-8273 • Fax (418) 542-5494  
Mississauga, ON (905) 673-9899 • Fax (905) 673-8394  
Montreal, QC (450) 492-3399 • Fax (450) 492-5682  
North Bay, ON (705) 840-8107 • Fax (705) 476-6683  
Oakville, ON (905) 825-8595 • Fax (905) 825-8598  
Pickering, ON (905) 839-0015 • Fax (905) 839-5641  
Port Elgin, ON (519) 389-6797 • Fax (519) 389-6799  
St. John's, NL (709) 753-2100 • Fax (709) 753-7011  
Sarnia, ON (519) 336-3021 • Fax (519) 336-8220  
Sherbrooke, QC (819) 620-5456 • Fax (819) 346-6828  
Sudbury, ON (705) 522-1849 • Fax (705) 522-9926  
Thunder Bay, ON (807) 475-4240 • Fax (807) 577-2017  
Timmins, ON (705) 365-8313 • Fax (705) 267-2855  
Val D'Or, QC (819) 856-6789 • Fax (819) 825-9564

**NÒTES:**

CROSS TUBE W.O. #5 95500, 93824  
95142, 95499.  
95449, 96272, 95450  
95232.